AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) Orbital welding device for mobile use for joining a first pipe end [[(1)]] and a second pipe end [[(2)]] along a circumferential joint [[(3)]] by means of at least one weld seam ~~(4), in particular~~ for producing a pipeline [[(5)]] to be laid on land comprising: ~~comprising at least~~

   - a guide ring ~~(6) which can be~~ oriented relative to the first pipe end [[(1)]] and the circumferential joint; ~~joint (3),~~
   - an orbital carriage [[(7)]] displaceably guided at least along a section of the guide ring; ~~ring (6),~~
   - a feed device ~~(8) by means of which~~ for moving the orbital carriage ~~(7) can be moved~~ under motor power along the guide ring; ~~ring (6),~~
   - a welding head which is arranged on the orbital carriage ~~(7) and can be aligned~~ in alignment with the circumferential joint [[(3)]] so that, by moving the orbital carriage [[(7)]], the weld seam ~~(4) can be~~ is produced at least along a section of the circumferential joint; ~~joint (3),~~
   - a connecting line; ~~line and~~
   - a mobile welding device ~~– in particular a mobile welding device –~~ which is a distance away from the orbital carriage [[(7)]] and is connected via the connecting line to the

welding head and ~~indirectly or directly~~ provides the power required for producing the weld seam; ~~seam (4),~~

- an orbital position sensor for detecting the orbital position of the orbital carriage; and
- a first process parameter control which is connected to the orbital position sensor and at least to the high-power laser beam source in such a way that laser radiation parameters are automatically adapted as a function of the orbital position of the orbital carriage;

wherein ~~characterized in that~~

- the welding device is ~~in the form of~~ a high-power [[fibre]] laser beam source [[(9)]], by means of which a laser beam ~~(10) can be~~ is produced,
- the connecting line is ~~in the form of~~ a waveguide [[(11)]] for guiding the laser beam [[(10)]] to the orbital carriage, ~~carriage (7)~~ and
- the welding head is ~~in the form of~~ a laser welding head [[(12)]] for directing the laser beam [[(10)]] into a laser welding zone [[(13)]] and for the consequent production of the weld seam [[(4)]].

2. (Currently Amended) Orbital welding device according to claim 1, ~~characterized in that~~ wherein

- the guide ring [[(6)]] is designed so as to be capable of being arranged on the outer surface [[(14)]] of the first pipe end, ~~end (1)~~ and
- the weld seam ~~which can be produced~~ is in the form of an outer weld seam [[(4)]].

3. (Currently Amended) Orbital welding device according to claim 1, ~~characterized by at least~~ further comprising:

- a process gas nozzle [[(20)]] arranged indirectly or directly on the orbital carriage [[(7)]] and intended for supplying process gas to the region of the laser welding zone; ~~zone (13),~~
- a process gas line; ~~line (21)~~ and
- a process gas store ~~(22) - in particular mobile process gas store -~~ which is a distance away from the orbital carriage [[(7)]] and is connected via the process gas line [[(21)]] to the process gas nozzle [[(20)]] for the supply of process gas.

4. (Currently Amended) Orbital welding device according to claim 1, ~~characterized by at least~~ further comprising:

- a wire nozzle [[(23)]] arranged indirectly or directly on the orbital carriage [[(7)]] and intended for supplying a wire [[(24)]] into the laser welding zone; ~~zone (13),~~
- a wire feed line; ~~line (25)~~ and
- a wire feed unit ~~(26) - in particular a mobile wire feed unit -~~ which is a distance away from the orbital carriage [[(7)]] and is connected via the wire feed line [[(25)]] to the wire nozzle [[(23)]] for supplying wire.

5. (Currently Amended) Orbital welding device according to claim 4, ~~characterized by~~ further comprising a wire heating unit [[(27)]] located upstream of the wire nozzle [[(23)]] and ~~intended~~ adapted for heating the wire [[(24)]].

6. (Currently Amended) Orbital welding device ~~according to claim 1, characterized by at least~~ for mobile use for joining a first pipe end and a second pipe end along a circumferential joint by means of at least one weld seam, in particular for producing a pipeline to be laid on land comprising:

· a guide ring oriented relative to the first pipe end and the circumferential joint;

· an orbital carriage displaceably guided at least along a section of the guide ring;

· a feed device for moving the orbital carriage under motor power along the guide ring;

· a welding head which is arranged on the orbital carriage in alignment with the circumferential joint so that, by moving the orbital carriage, the weld seam is produced at least along a section of the circumferential joint;

· a connecting line; and

· a mobile welding device which is a distance away from the orbital carriage and is connected via the connecting line to the welding head and provides the power required for producing the weld seam;

wherein

· the welding device is a high-power laser beam source, by means of which a laser beam is produced;

· the connecting line is a waveguide for guiding the laser beam to the orbital carriage;

· the welding head is a laser welding head for directing the laser beam into a laser welding zone and for the consequent production of the weld seam;

· ~~an MSG~~ a gas metal arc welding (GMAW) head ~~(28) which~~ is arranged indirectly or directly on the orbital carriage; ~~carriage (7) and can be aligned under motor power in particular relative to the orbital carriage (7),~~

- ~~an MSG power line (29),~~
- ~~an MSG process gas store (30),~~
- ~~an MSG wire feed line (31),~~
- the connecting line includes a GMAW power line, a GMAW process gas line, and a GMAW wire feed line;
- ~~an MSG~~ a GMAW power source ~~(32) - in particular a mobile and freely programmable MSG power source - which~~ is a distance away from the orbital carriage [[(7)]] and is connected via the [[MSG]] GMAW power line [[(29)]] to the ~~MSG arc welding~~ GMAW head [[(28)]] for forming the [[MSG]] GMAW arc; [[arc,]]
- ~~an MSG~~ a GMAW process gas store ~~(30) - in particular mobile MSG process gas store - which~~ is a distance away from the orbital carriage [[(7)]] and is connected via the ~~MSG processing~~ GMAW process gas line [[(30)]] to the ~~MSG arc welding~~ GMAW head [[(28)]] for supplying the [[MSG]] GMAW process gas; [[gas,]] and
- ~~an MSG~~ a GMAW wire feed unit ~~(34) - in particular mobile MSG wire feed unit - which~~ is a distance away from the orbital carriage [[(30)]] and is connected via the [[MSG]] GMAW wire feed line [[(31)]] to the ~~MSG arc welding~~ GMAW head [[(28)]] for supplying the [[MSG]] GMAW wire.

7. (Currently Amended) Orbital welding device according to claim 6, ~~characterized in that~~ wherein the ~~MSG arc welding~~ GMAW head [[(26)]] is arranged indirectly or directly on the orbital carriage [[(7)]] in such a way that the laser beam [[(10)]] and the [[MSG]] GM arc cooperate in the laser welding zone [[(13)]].

8. (Currently Amended) Orbital welding device according to claim 6, ~~characterized in that the MSG arc welding~~ wherein the GMAW head [[(28)]] is arranged indirectly or directly on the orbital carriage (7) in such a way that the laser beam (10) and the MSG arc act in separate process zones.

9. (Currently Amended) Orbital welding device according to claim 6, ~~1 characterized by~~ wherein an orbital position sensor [[(18)]] for detecting the orbital position [[(α)]] of the orbital carriage ~~(7) and~~ is connected to a first process parameter control [[(19)]] which ~~is formed and is connected to the orbital position sensor (18) and at least to the high-power fibre laser beam source (9) and in particular to the MSG power source (32) and the feed device (8) in such a way that laser radiation parameters and in particular MSG~~ automatically varies GMAW arc parameters and the speed of advance of the orbital carriage ~~(7) can be automatically adapted~~ as a function of the orbital position [[(α)]] of the orbital carriage [[(7)]].

10. (Currently Amended) Orbital welding device according to claim 1, ~~characterized by~~ wherein

- a seam tracking sensor ~~(15) which~~ is arranged indirectly or directly on the orbital carriage ~~(7) in particular so as to be ahead of the intended laser welding zone (13)~~ in such a way that the position of the circumferential joint [[(3)]] relative to the intended laser welding zone ~~(13) can be~~ is detected; ~~detected,~~

- adjusting means ~~(16) by means of which~~ orients the laser beam ~~(10) - and in particular the wire nozzle (23) or the MSG arc welding head (28) - can be oriented~~ relative to the circumferential joint; ~~joint (3),~~ and
- a position control ~~(17) which is formed and~~ is connected to the seam tracking sensor [[(15)]] and the adjusting means [[(16)]] in such a way that the orientation of the laser beam ~~(10) - and in particular of the wire nozzle (23) or of the MSG arc welding head (28) can be~~ is automatically regulated as a function of the detected position of the circumferential joint [[(3)]].

11. (Currently Amended) Orbital welding device according to claim 6 [[1]], further comprising: ~~characterized by~~

- a process sensor [[(40)]] arranged indirectly or directly on the orbital carriage ~~(7) - in particular on the laser welding head (12) -~~ in such a way that electromagnetic radiation ~~- in particular thermal radiation, optical radiation or plasma radiation -~~ from the laser welding zone ~~(13) can be~~ is detected; ~~detected,~~ and
- a second process parameter control ~~(41) which is formed and is~~ connected to the process sensor [[(40)]] and at least the high-power [[fibre]] laser beam source ~~(9) - and in particular to the MSG power source (32), the feed device (8) and the adjusting means (16) -~~ in such a way that ~~laser radiation parameters - and in particular MSG~~ at least GMAW arc parameters, the speed of advance of the orbital carriage [[(7)]] and the orientation of the laser beam ~~(10) - can be~~ are automatically adapted as a function of the detected radiation.

12. (Currently Amended) Orbital welding device according to claim 1, ~~characterized by~~ further comprising:

- an optical seam quality sensor [[(38)]] arranged indirectly or directly on the orbital carriage [[(7)]], tracking the laser welding zone [[(13)]] and ~~intended~~ adapted for making optical recordings of the weld seam [[(4)]] produced; and
- logging means [[(39)]] which are connected to the seam quality sensor [[(38)]] for storage and optical playback of the recordings of the weld seam [[(4)]] produced.

13. (Currently Amended) Orbital welding device according to claim 12, ~~characterized by~~ further comprising image processing means [[(42)]] which ~~are formed and are~~ is connected to the logging means [[(39)]] in such a way that the recordings of the weld seam [[(4)]] produced ~~can be~~ is electronically evaluated and an evaluation signal which is associated with the quality of the weld seam ~~(4) can be~~ is output.

14. (Currently Amended) Orbital welding device according to claim 13, ~~characterized by~~ further comprising a third process parameter control [[(43)]] which ~~is formed and~~ is connected at least to the image processing means [[(42)]] and the high-power [[fibre]] laser beam source ~~(9) - and in particular to the MSG power source (32), the feed device (8) and the adjusting means (16) -~~ in such a way that ~~laser radiation parameters - and in particular MSG arc parameters,~~ the speed of advance of the orbital carriage [[(7)]] and the orientation of the laser beam ~~(10) - can be~~ are automatically adapted as a function of the evaluation signal.

15. (Currently Amended) Orbital welding device according to claim 1, ~~characterized by~~ wherein a transport vehicle ~~(35) which can be~~ is moved longitudinally under motor power outside the first pipe [[(1)]] and the second pipe [[(2)]] and on which at least

- the high-power [[fibre]] laser beam source [[(9)]],
- a generator [[(36)]] at least for generating the power required for operating the high-power [[fibre]] laser beam source [[(9)]] and
- a cooling system [[(37)]], coordinated at least with the high-power [[fibre]] laser beam source [[(9),]]

~~and in particular~~

- ~~the process gas store (22),~~
- ~~the wire feed unit (26),~~
- ~~the MSG power source (32),~~
- ~~the MSG process gas store (33) and~~
- ~~the MSG wire feed unit (34)~~

are arranged so that the orbital welding device can be operated in a substantially stand-alone mobile manner.

16. (Currently Amended) Transport vehicle [[(35)]] of an orbital welding device according to claim 15, ~~characterized by~~ wherein

- [[a]] the high-power [[fibre]] laser beam source [[(9)]],
- [[a]] the generator [[(36)]] at least for generating the power required for operating the high-power [[fibre]] laser beam source, ~~source (9) and~~

- [[a]] the cooling system [[(37)]] coordinated at least with the high-power [[fibre]] laser beam source, ~~source (9)~~

- a process gas store,

- a wire feed unit,

- a GMAW power source,

- a GMAW process gas store and

- a GMAW wire feed unit

are arranged on the transport vehicle [[(35)]].

17. (Cancelled)

18. (Cancelled)

19. (New) Orbital welding device according to claim 6, wherein the orbital welding device is adapted to perform the welding of the pipe studs by means of only one orbit pass.

20. (New) Orbital welding device according to claim 1, wherein the high-power laser beam source is a high-power fibre laser beam source.

21. (New) Orbital welding device according to claim 6, wherein

- a seam tracking sensor is arranged indirectly or directly on the orbital carriage in such a way that the position of the circumferential joint relative to the intended laser welding zone is detected;

- adjusting means orients the laser relative to the circumferential joint; and
- a position control is connected to the seam tracking sensor and the adjusting means in such a way that the orientation of the laser beam is automatically regulated as a function of the detected position of the circumferential joint.

22. (New) Orbital welding device according to claim 6, further comprising:

- an optical seam quality sensor arranged indirectly or directly on the orbital carriage, tracking the laser welding zone and adapted for making optical recordings of the weld seam produced; and
- logging means which are connected to the seam quality sensor for storage and optical playback of the recordings of the weld seam produced.

23. (New) Orbital welding device according to claim 22, further comprising image processing means which is connected to the logging means in such a way that the recordings of the weld seam produced is electronically evaluated and an evaluation signal which is associated with the quality of the weld seam is output.

24. (New) Orbital welding device according to claim 23, further comprising a third process parameter control which is connected at least to the image processing means and the high-power laser beam source in such a way that the speed of advance of the orbital carriage and the orientation of the laser beam are automatically adapted as a function of the evaluation signal.

25. (New) Orbital welding device according to claim 6, wherein a transport vehicle is moved longitudinally under motor power outside the first pipe and the second pipe and on which at least

- the high-power laser beam source,
- a generator at least for generating the power required for operating the high-power laser beam source and
- a cooling system, coordinated at least with the high-power laser beam source

are arranged so that the orbital welding device can be operated in a substantially stand-alone mobile manner.

26. (New) Transport vehicle of an orbital welding device according to claim 25, wherein

- the high-power laser beam source,
- the generator at least for generating the power required for operating the high-power laser beam source,
- the cooling system coordinated at least with the high-power laser beam source,
- a process gas store,
- a wire feed unit,
- the GMAW power source,
- the GMAW process gas store and
- the GMAW wire feed unit

are arranged on the transport vehicle.

27. (New) Orbital welding device according to claim 6, wherein the high-power laser beam source is a high-power fibre laser beam source.